

THE
TALE
OF THE
TERRIFYING TANK

Advanced Site Characterization Tools and a
Journey towards Cleanup

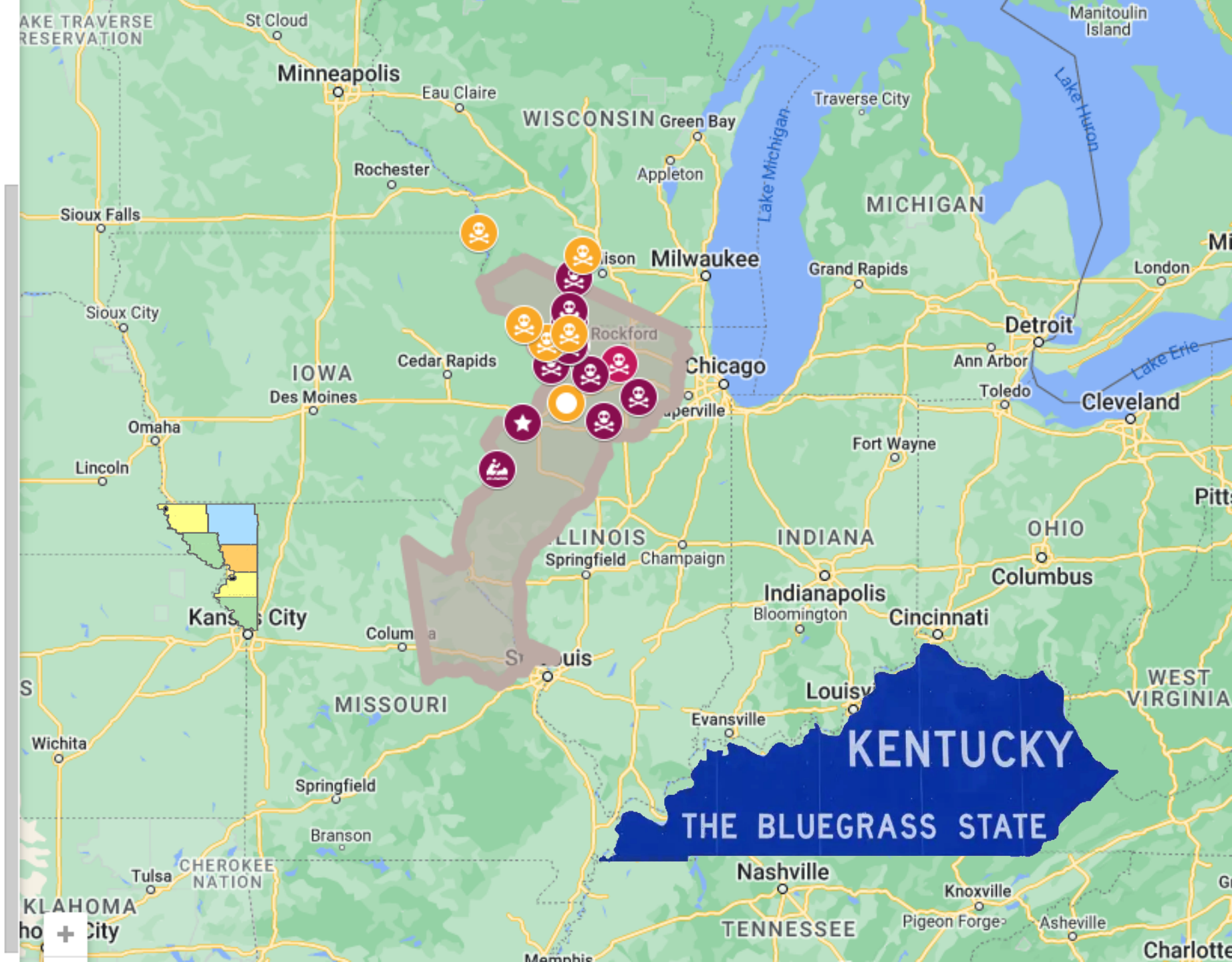


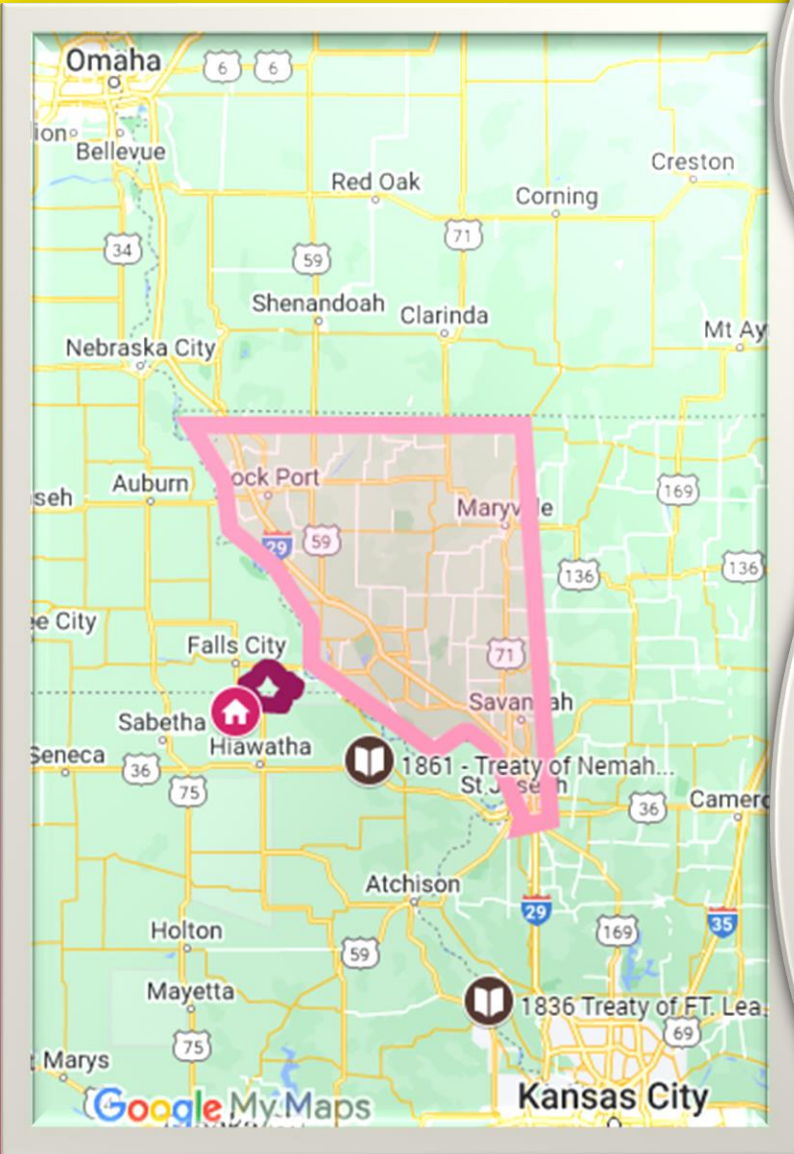


**THE SAC AND FOX NATION
OF MISSOURI
IN
KANSAS AND NEBRASKA**



- 1804 Treaty Line
- Treaty of 1804
- Yellow Banks: April 5, 1832
- Prophetstown: May 10
- Stillman's Run: May 14
- Buffalo Grove: May 19
- Indian Creek: May 21
- Plum River Raid: May 21
- St. Vrain: May 24
- Fort Blue Mounds: June 6, 20
- Spafford Farm: June 14
- Horseshoe Bend: June 16
- Ament's Cabin: June 17
- Kellogg's Grove: June 16, 26
- Apple Valley Fort: June 24
- Waddam's Grove: June 18
- Sinsiniwa Mound: June: 29
- Wisconsin Heights: July 21
- Saukenuk
- Bad Axe Massacre: August 1







SAC AND FOX
TRUCK STOP



UNLEADED
REGULAR
MID-GRADE
PREMIUM
DIESEL

UNLEADED	2.89
REGULAR	2.89
MID-GRADE	3.09
PREMIUM	3.29
DIESEL	4.75

Sac & Fox
Truck Stop

STOP

July 20, 2015

NeXGen
Forecourt Controller
ALLIED
Sales and Technical Support
Call 800-888-2811
or 714-766-2228

VEEDER-ROOT $\frac{V}{R}$

UR NIGHTMARE IS STARTING

ALARM
WARNING
POWER

1	2	3
4	5	6
7	8	9
0	→	←

Please put readings in basket
do not crumple them up and
throw away, throw them on the
floor or put on top of something.
Thank you!

External
Distribution Box
DIESEL
Pumps





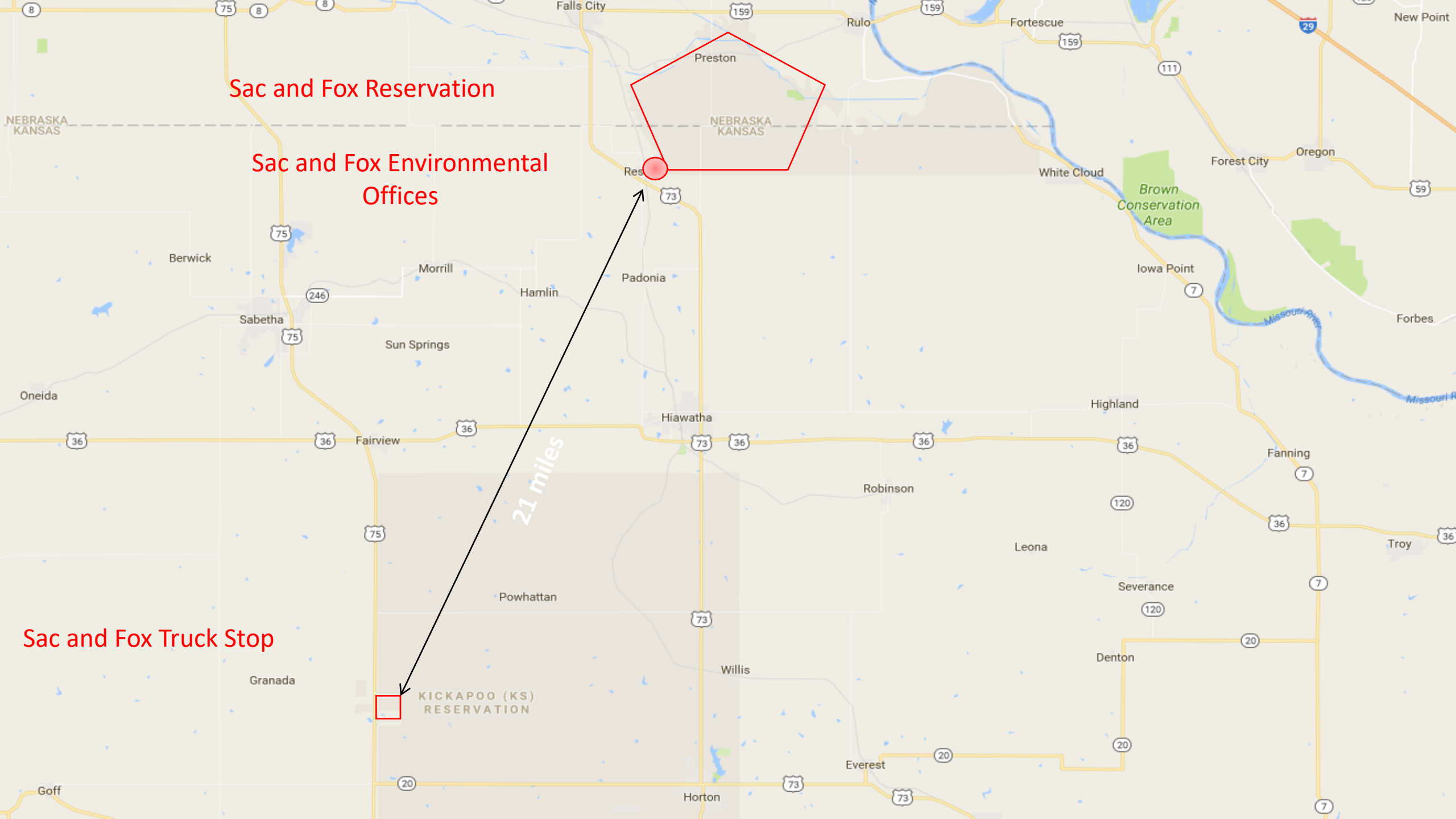
Sac and Fox Reservation and the Sac and Fox Truck Stop

Sac and Fox Reservation

Sac and Fox Environmental
Offices

Sac and Fox Truck Stop

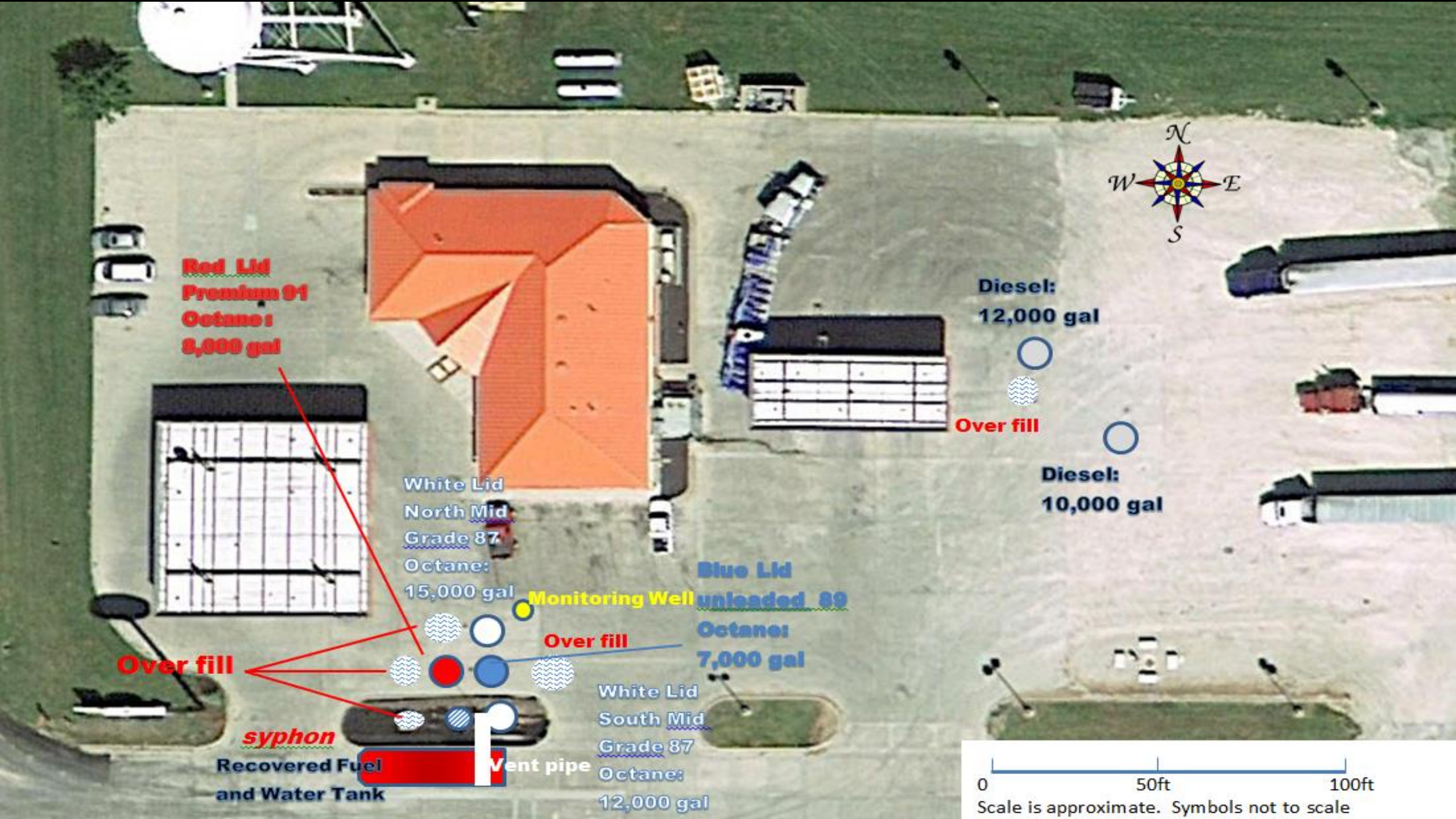
21 miles



July 22, 2015



19,000 Gallons



Red Lid
Premium 91
Octane:
8,000 gal



Diesel:
12,000 gal

Over fill

Diesel:
10,000 gal

White Lid
North Mid
Grade 87
Octane:
15,000 gal

Blue Lid
unleaded 89
Octane:
7,000 gal

Monitoring Well

Over fill

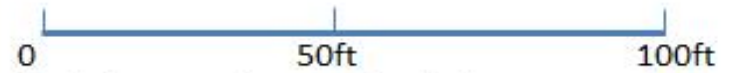
White Lid
South Mid
Grade 87
Octane:
12,000 gal

Over fill

syphon

Recovered Fuel
and Water Tank

Vent pipe



Scale is approximate. Symbols not to scale

July 22, 2015

Scoping the Tank



A Pile of Gravel



November 19, 2015



Geologists take analytical samples for testing and drill for 4 Temporary Piezometers.

February 16, 2016

Received Site Investigation Report of general soil characteristics of the subsurface and initial impacts to the soil and groundwater.

5 permanent monitoring wells, help complete an initial conceptual site model (CSM), screen and model groundwater data to determine soil vapor inhalation risk.

February 29, 2016

Plan to continue with finalization of remediation and repair or abandonment of ruptured fuel tank.

The only way to determine the cause of the ruptured fuel tank would be to investigate the site. After determining the cause, being impact or defect then the decision will be made to either repair the existing Xerxes double wall tank or abandon the tank.

While the tank site is open, we will be prepared to deal with free product, define plume and install wells. Initially 5 wells were suggested but was determined 2 would be sufficient. All work pending estimates and approval from Insurance Companies.

July 11, 2016





Finally Breaking Ground

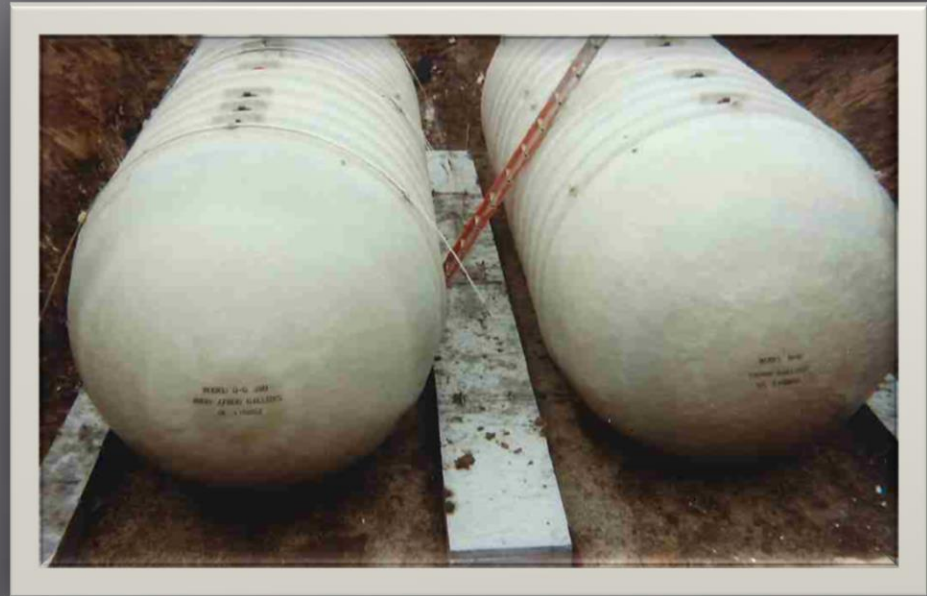
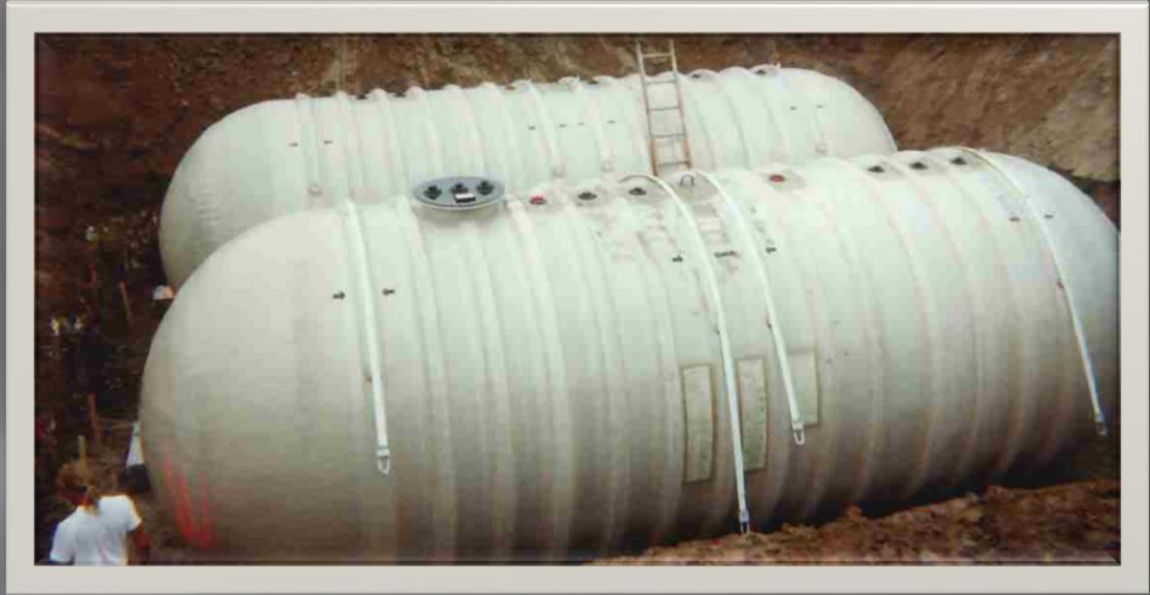
July 11, 2016

July 27, 2016









July 29, 2016

December 12, 2016



December 15, 2016



January 18, 2017



February 10, 2017



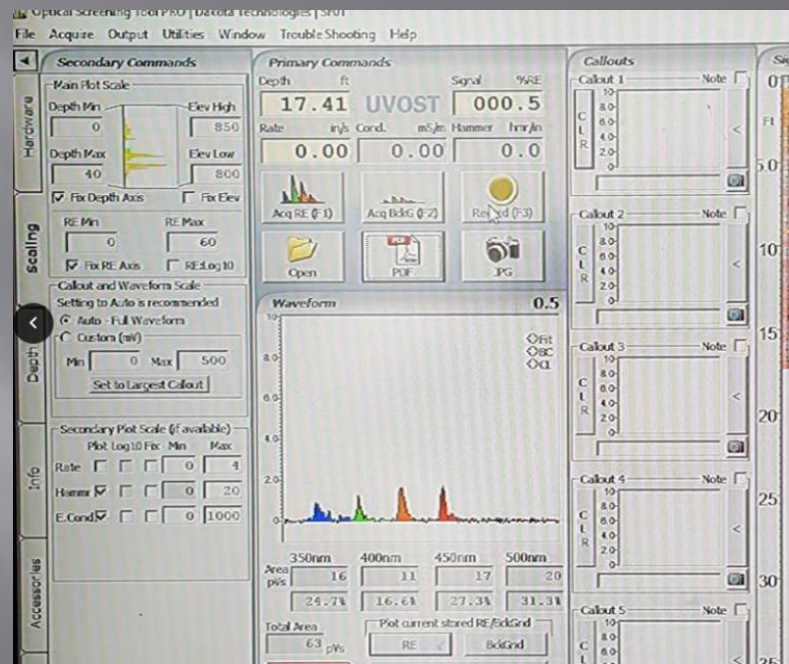
Mar. 2017 – Feb. 2018

13 new wells are drilled bring the total to 18

Vapor Intrusion is investigated

Geology and Ground Water is studied

We bring in more technology



March 19, 2018



March 19, 2018



DISABLE ALL COLLAPSE ALL

CONFIRMATION-SOILS-LABS Total: 5

ICONS LABELS

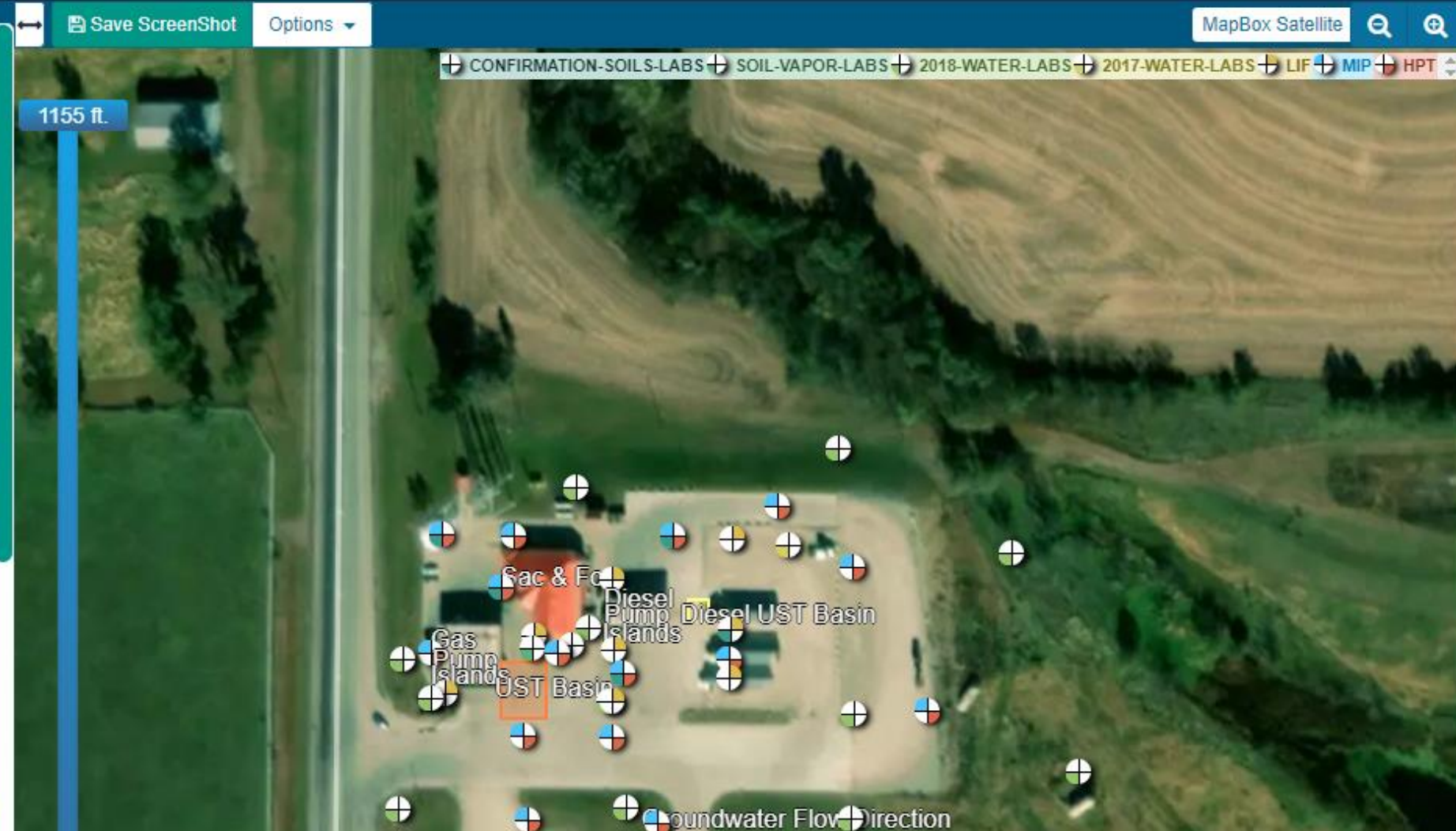
Compounds	Layers	Stations/Max Vals
<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/> >nC12 to nC28		
<input checked="" type="checkbox"/> >nC28 to nC35		
<input checked="" type="checkbox"/> nC6 to nC12		
<input checked="" type="checkbox"/> Total Petroleum Hydrocarbon		

SOIL-VAPOR-LABS Total: 2

ICONS LABELS

Compounds	Layers	Stations/Max Vals
<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/> Benzene	<input checked="" type="checkbox"/> Xylenes	
<input checked="" type="checkbox"/> Ethylbenzene		
<input checked="" type="checkbox"/> MTBE		
<input checked="" type="checkbox"/> Naphthalene		
<input checked="" type="checkbox"/> Toluene		

2017-WATER-LABS





Sac & Fox Truck Stop

ATM (Sac & Fox Truck Stop)

original tank pit

MW4

MW6

MW17

MW8

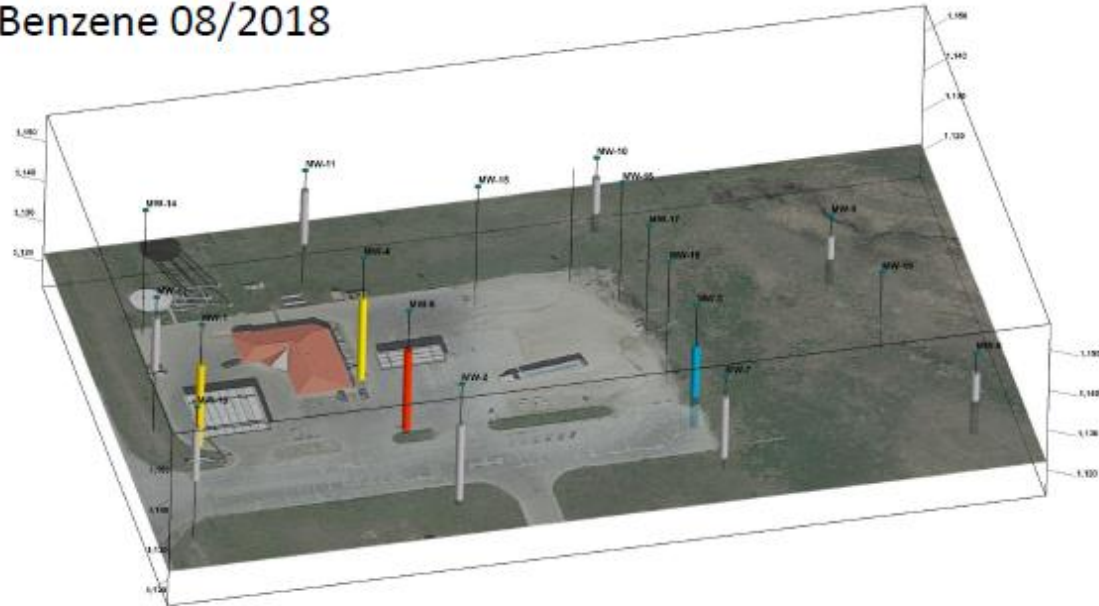
MW13

MW2

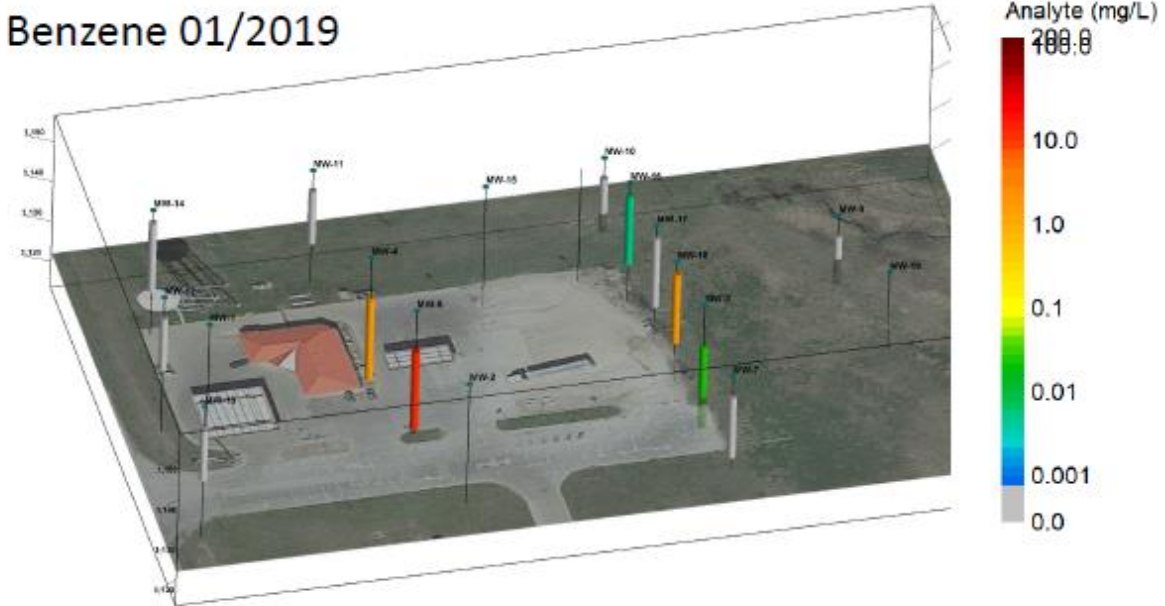
MW7

& Fox Gaming
Commission

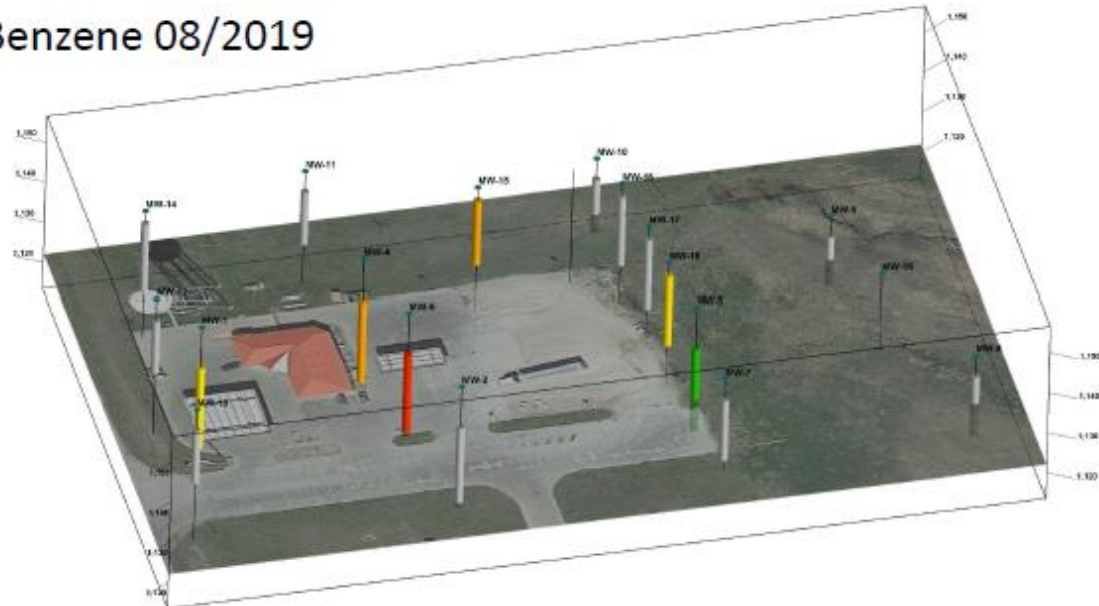
Benzene 08/2018



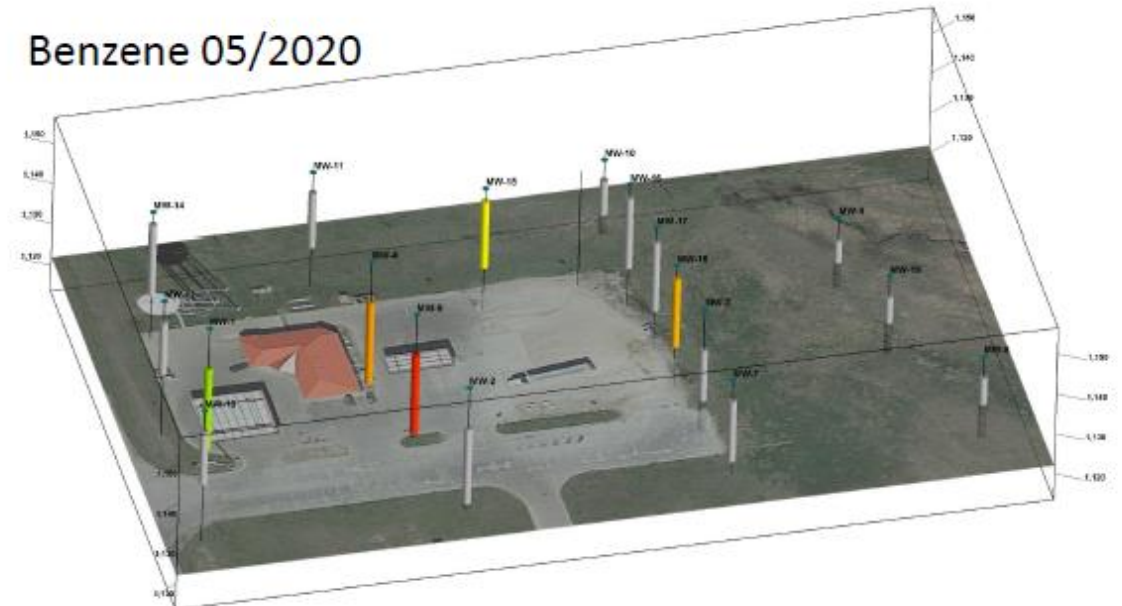
Benzene 01/2019



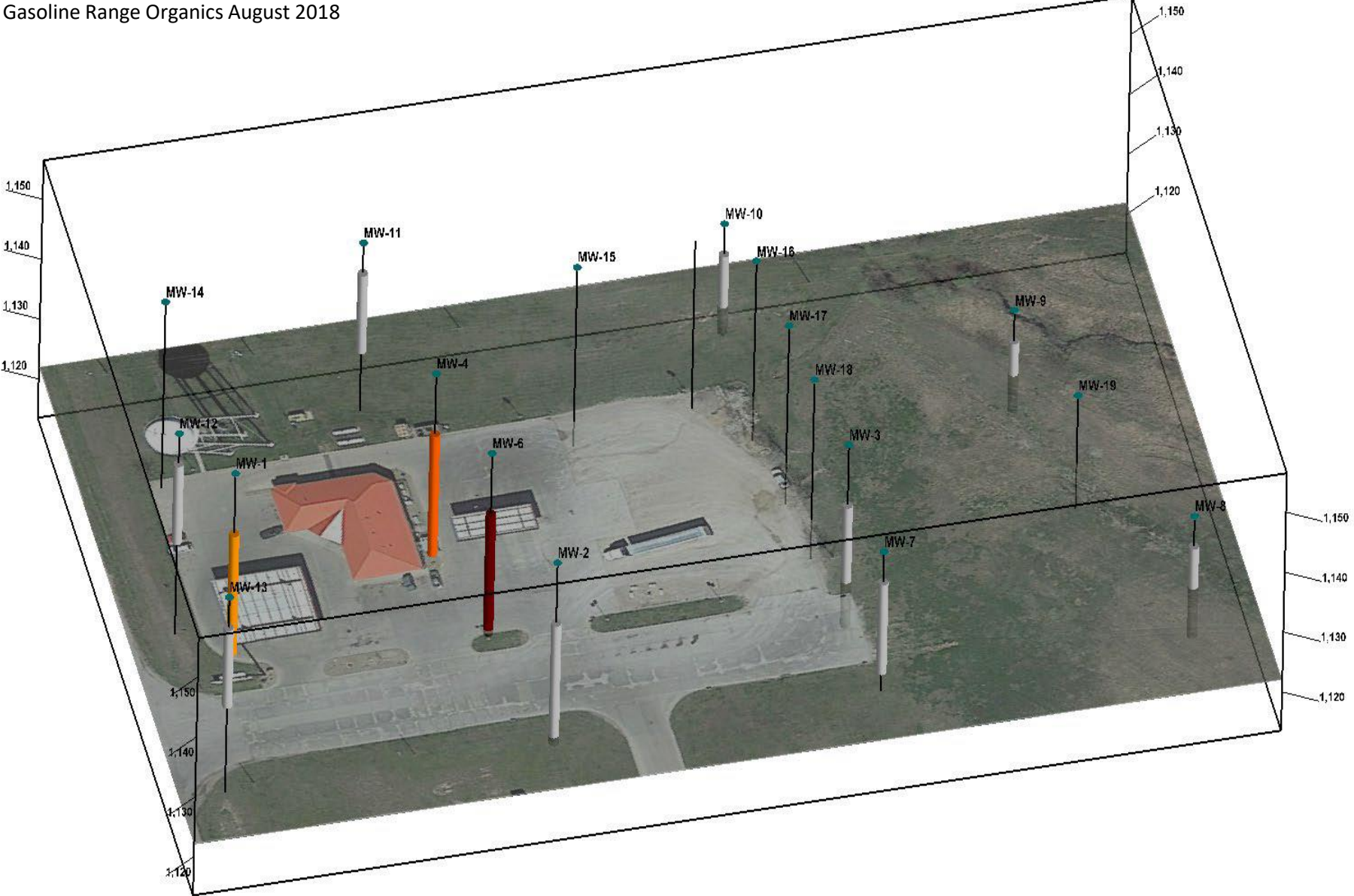
Benzene 08/2019



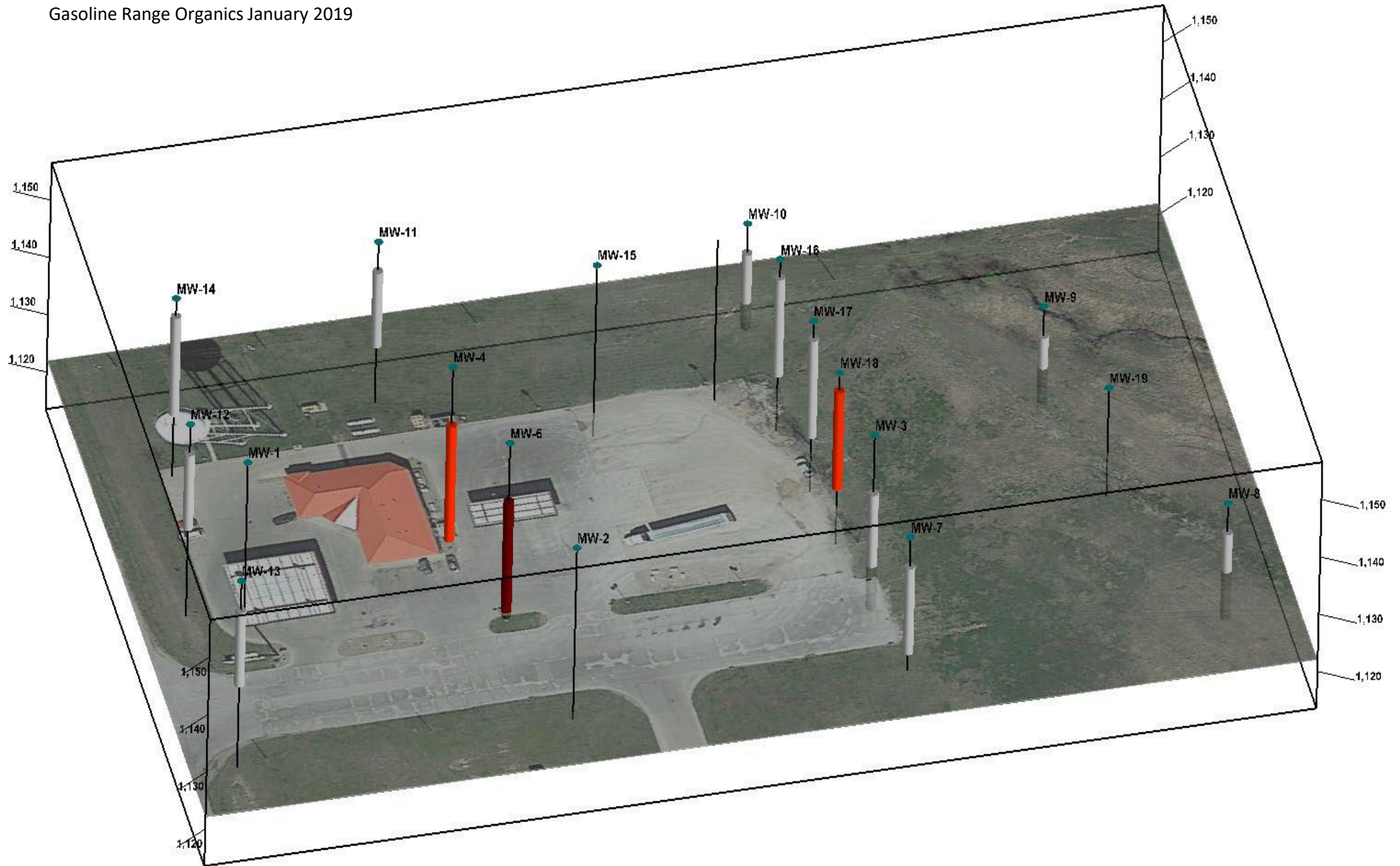
Benzene 05/2020



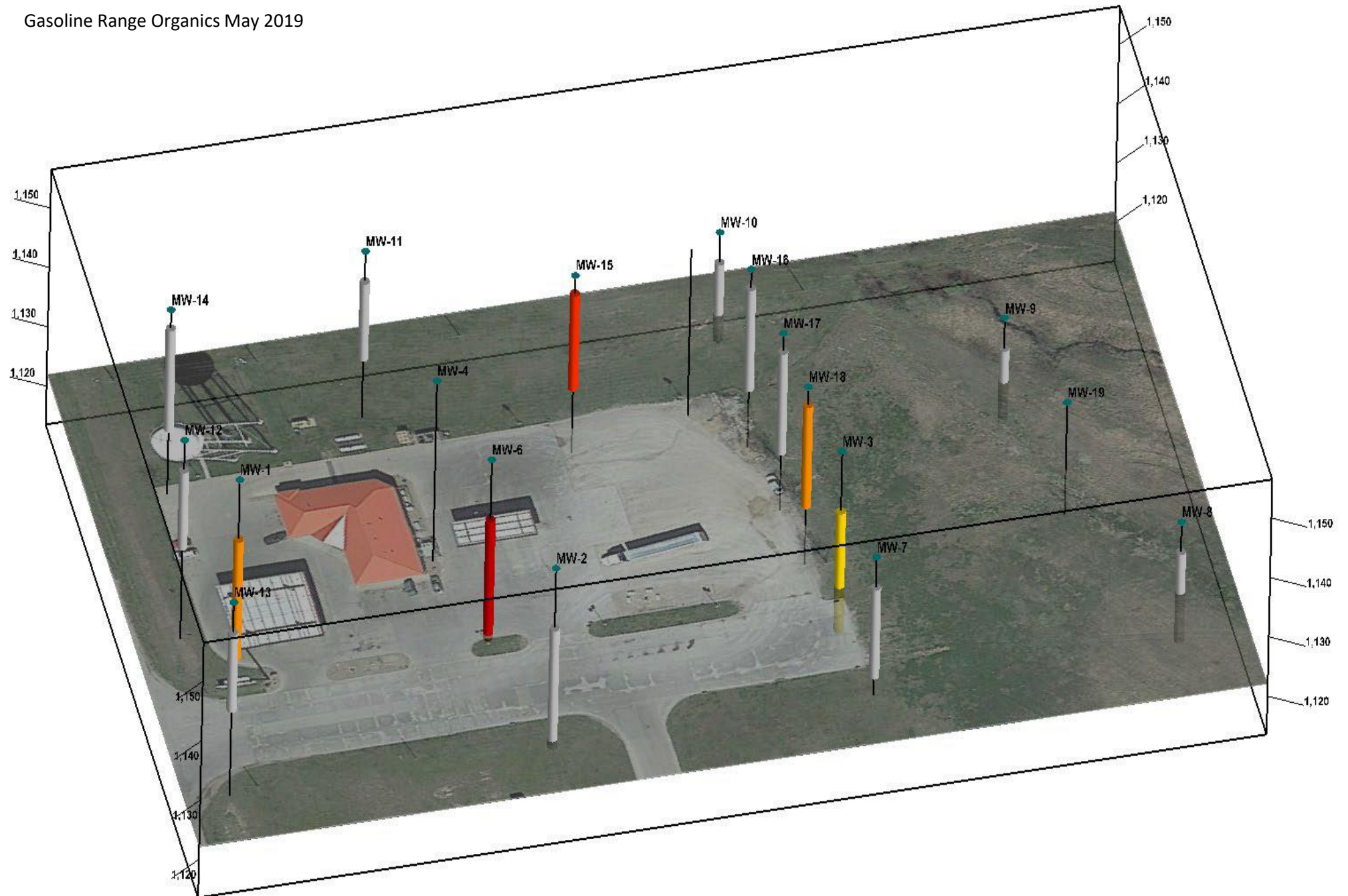
Gasoline Range Organics August 2018



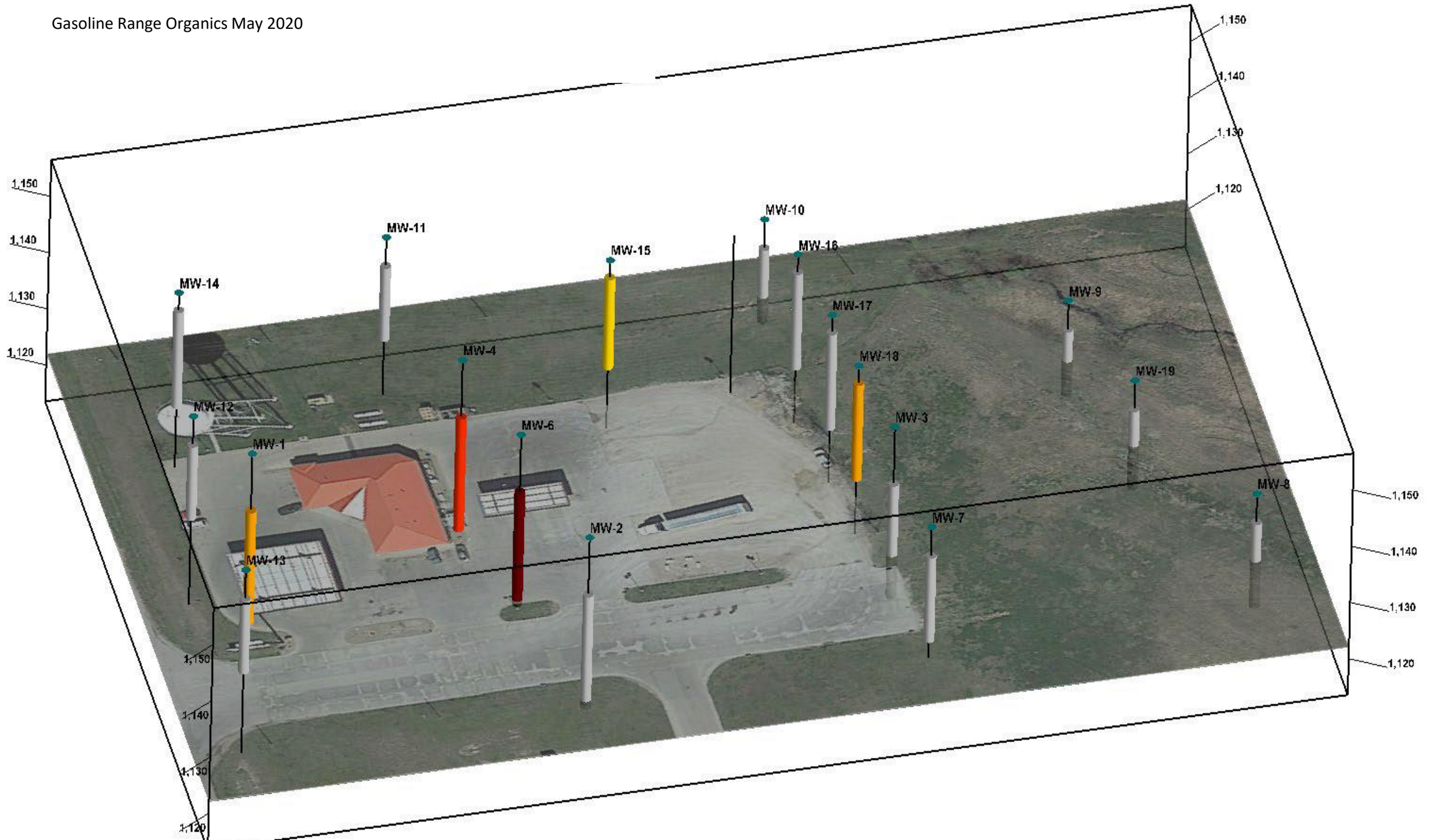
Gasoline Range Organics January 2019



Gasoline Range Organics May 2019



Gasoline Range Organics May 2020



1,150

1,148

1,146

1,144

1,142

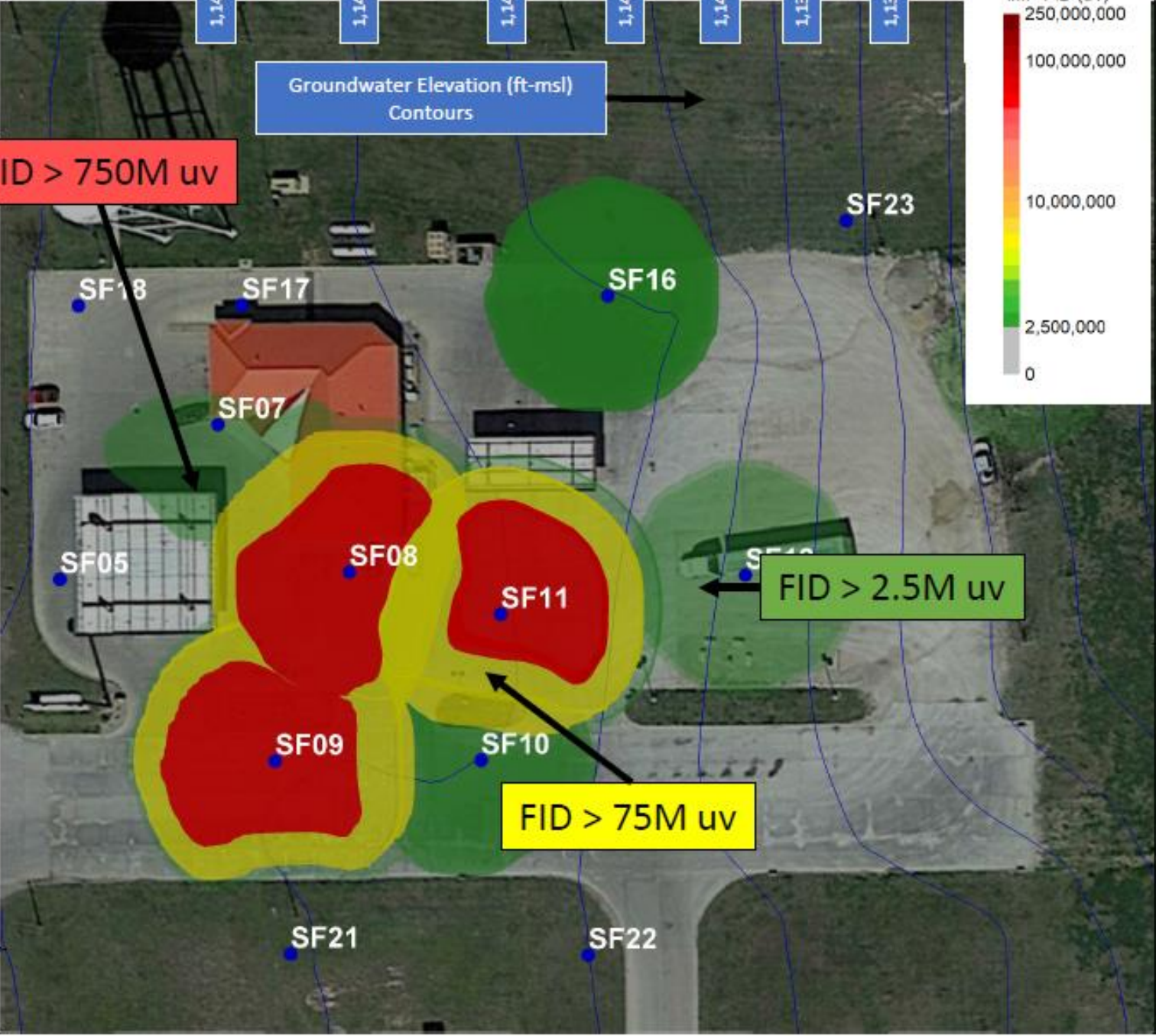
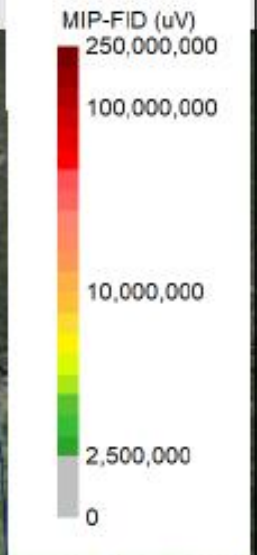
1,140

1,138

1,136

FID > 750M uv

Groundwater Elevation (ft-msl)
Contours



FID > 2.5M uv

FID > 75M uv

LNAPL Footprint

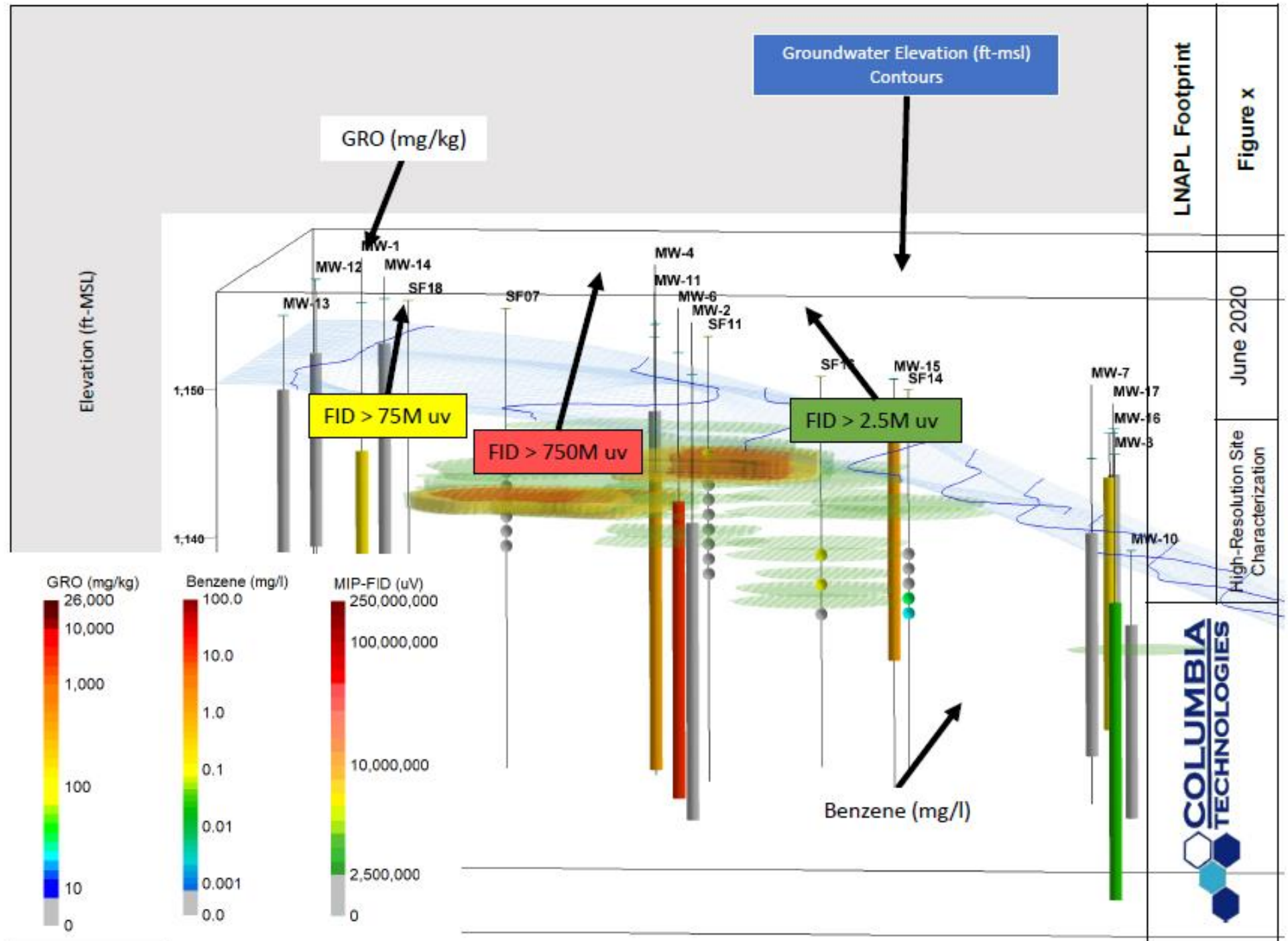
Figure x

June 2020

High-Resolution Site
Characterization

SF20



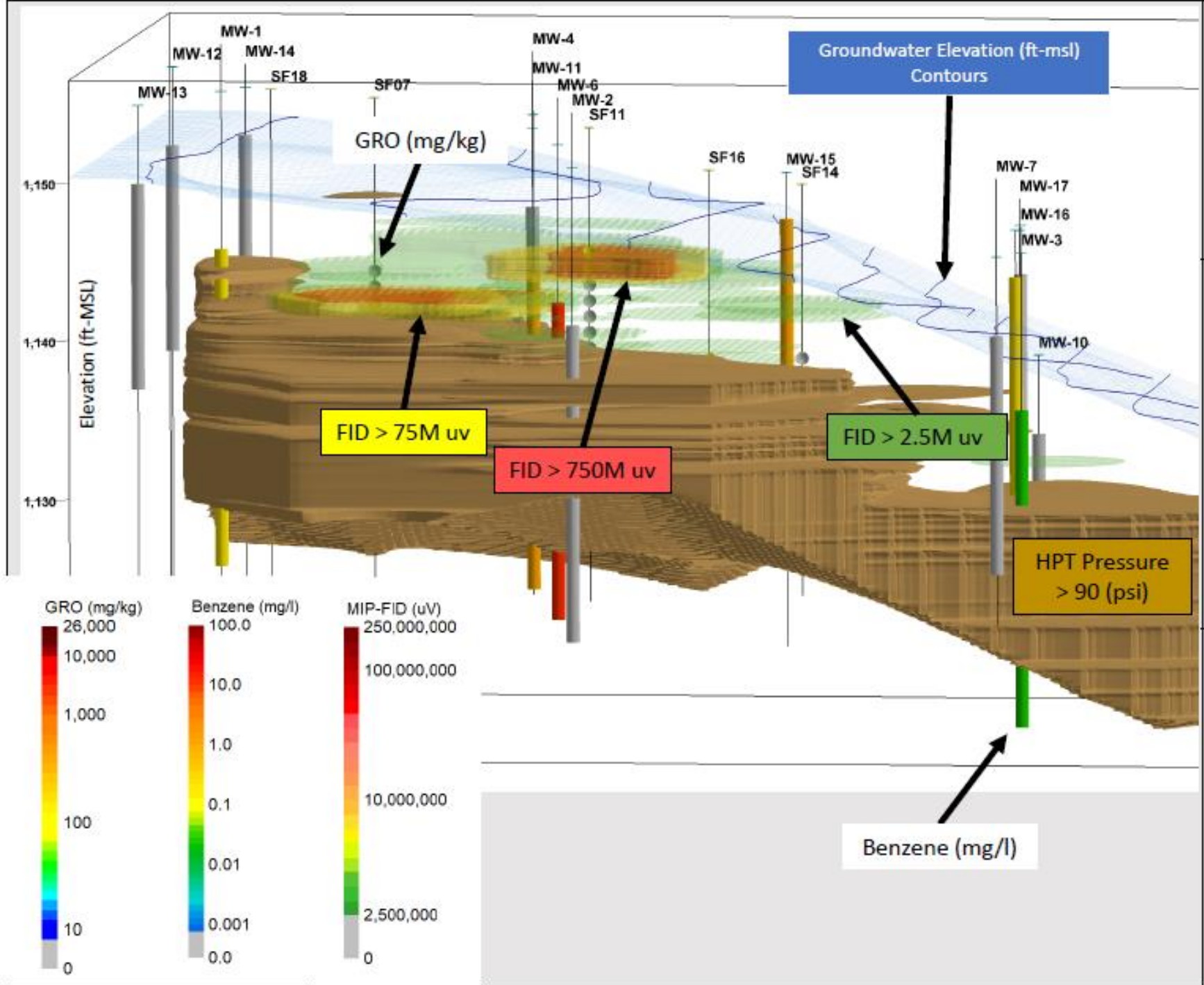


LNAPL Footprint

Figure x

June 2020

High-Resolution Site Characterization



LNAPL Footprint

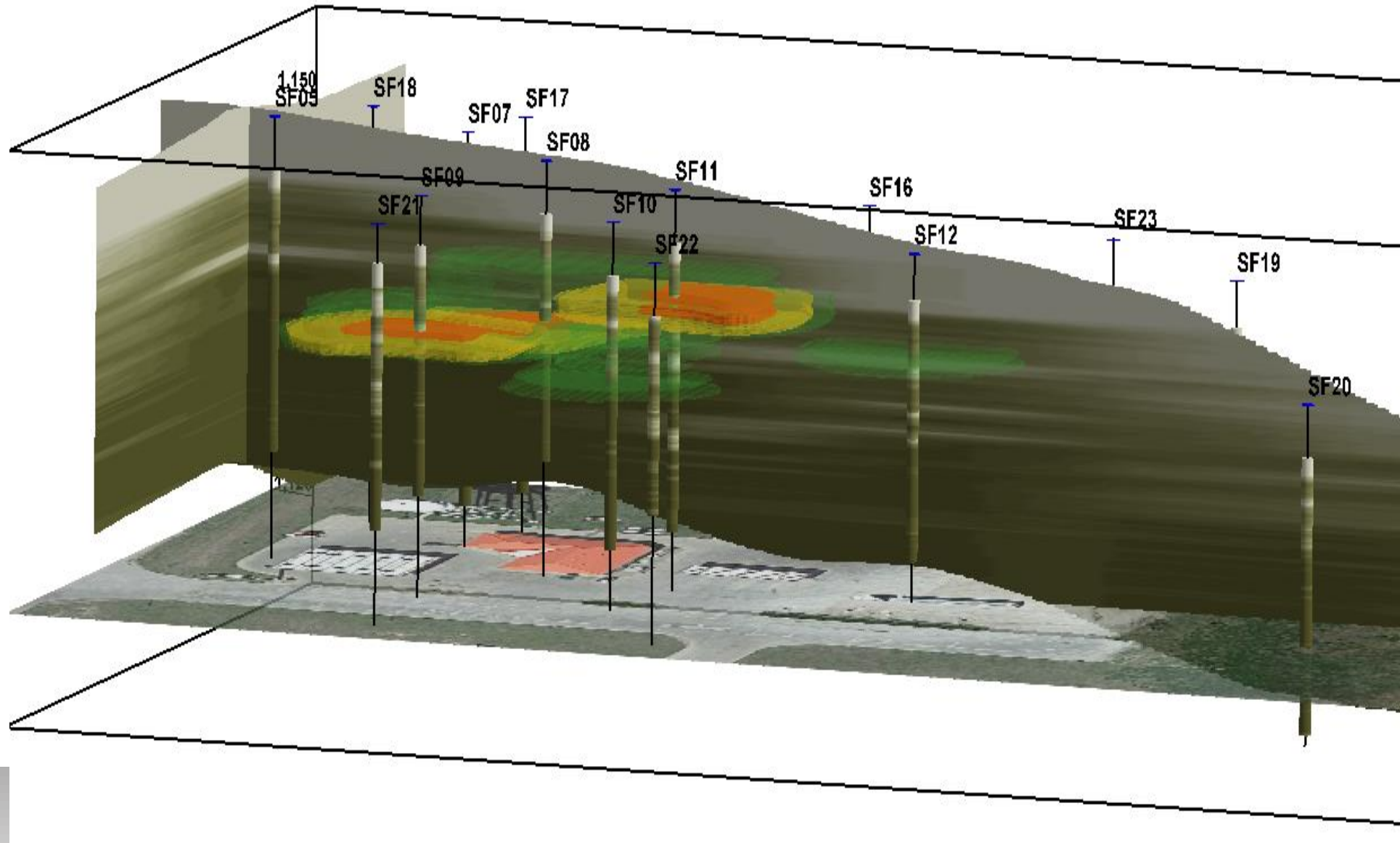
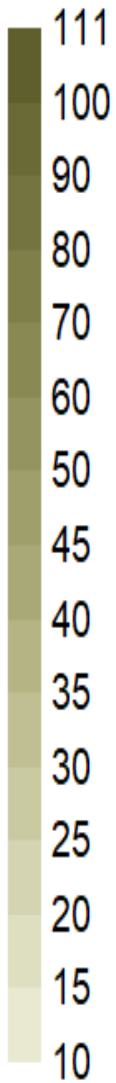
Figure x

June 2020

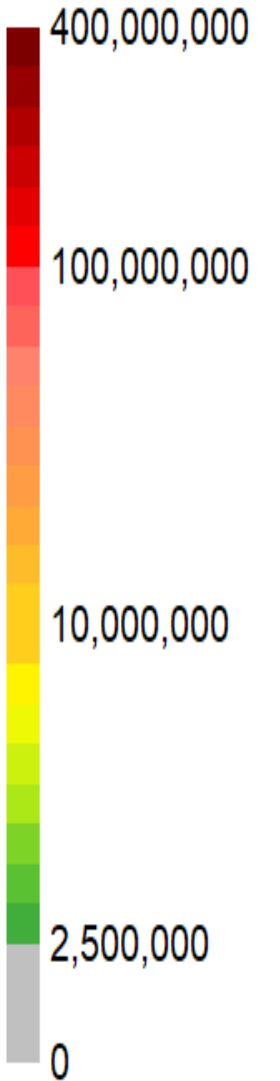
High-Resolution Site Characterization



HPT Pressure (psi)



MIP-FID (uV)



What We Know

- ✦ Approximately 400 gallons of fuel
- ✦ Moving Slowly (50-200 ft per year) east
- ✦ Depth is 12-18 feet in clay layers
- ✦ No receptors yet
- ✦ Some product is attenuating
- ✦ Vapor intrusion is not a priority yet

4 Potential Remedies

 Excavation

 Permeable Reactive Barrier

 Bio-Remediation

 Natural Attenuation

**THE
END**

